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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/552,618

08/25/2006

Berndt Cramer

10191/4522

6299

26646

7590

03/03/2010

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EXAMINER

DINH, BACH T

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

03/03/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/552,618	Applicant(s) CRAMER ET AL.	
	Examiner BACH T. DINH	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/06/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/06/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/06/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Summary

1. This is the initial office action based on the 10/522,618 application filed on 10/06/2005.
2. Claims 11-28 are currently pending and have been fully considered.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 13-14 and 23-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claims 1 and 21 are drawn to apparatuses; however, claims 13-14 and 23-24 only recite the average of the pump current is provided and the number of ON and OFF phases are provided without reciting any structures that would further limit the apparatuses as recited by the independent claims. Therefore, claims 13-14 and 23-24 are indefinite for failing to further define the structure as required by the independent claims.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 11-15, 20-24 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Metrich (US 5,312,538).

Addressing claims 11 and 20-21, Metrich discloses a gas sensor device (figure 1), comprising:

A sensor chamber 3 that receives via a diffusion barrier a gas to be analyzed (the aperture made in the solid electrolyte layer 5 that connects the outside to the sensor chamber 3 is equivalent to the diffusion barrier for it restricts the movement of gas into the sensor chamber 3);

At least one pump cell (the electrodes 9, 10 and the portion of the solid electrolyte layer 5 between them constitute the pump cell) situated between the sensor chamber and the gas to be analyzed, wherein the at least one pump cell is exposed to the gas to be analyzed and includes an outer pump electrode 9 (figure 1);

A measuring electrode 7 situated in a reference-gas space 4;

A measuring cell (the electrodes 6, 7 and the portion of the solid electrolyte layer 5 between them constitute the measuring cell) situated between the sensor chamber 3 and the reference gas space 4, wherein the outer pump electrode 9 of the pump cell exposed to the gas to be analyzed receives a pump current which depends on a measuring voltage

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that is applied to the measuring electrode situated in the reference gas space (3:5-12 and 4:21-29); and

A constant current source for supplying the pump current (4:1-29, the circuit depicted in figure 1 is the constant current source), wherein the constant current source is at least one of: a) configured to be set to at least two values of the pump current (figure 2b, I_{max} and $-I_{max}$) and b) configured for alternating operation with ON phases and OFF phases, the duration of the ON phases and OFF phases being specified (figure 2C, the ON phases are I_{max} or $-I_{max}$ and the OFF phases are at the base line; furthermore, figure 2C shows that the ON and OFF phases have predetermined duration; therefore, they are being specified).

Addressing claims 12 and 22, in figures 2B-2D, I_{max} is the positive polarity value and $-I_{max}$ is the negative polarity value for the pump current.

Addressing claims 13 and 23, Metrich discloses adjusting the average pump current passing through the oxygen pump 2 (4:21-29); therefore, the average pump current is provided. Furthermore, Metrich discloses the duration and direction of the pump current is fixed for controlling the average pump current (6:13-39) and the average pump current is calculated from the pump current, which has fixed duration (6:55-7:7). Therefore, the average pump current, which depends on the pump current with fixed duration, also has a fixed duration. Hence, Metrich discloses the average pump current over a predefined measuring time is provided. Additionally, current claims fail to recite any structures that

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would further limit the apparatuses of the independent claims; therefore, it is inherent that the device of Metrich, which comprises all the structures of the independent claims, would be capable of providing the average pump current over a predefined measuring time, for this recitation merely refers to the function of the device.

Addressing claims 14 and 24, Metrich discloses the direction and the duration of the pump current are fixed (6:13-39) and figures 2B-2D show that the value of the pump current is also fixed. Furthermore, figure 2C shows three ON phases or I_{max} phases and three OFF phases or when the current is at the baseline; therefore, Metrich discloses the number of ON and OFF phases are predefined.

Addressing claims 15 and 25, in figure 2A, the measuring voltage V_s is recorded during the OFF phases shown in figure 2C.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 16, 19, 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Metrich (US 5,312,538) in view of Miyata et al. (US 5,895,564).

Addressing claims 16, 19, 26 and 28, Metrich discloses the pump current is controlled based on the measuring voltage of the measuring cell (4:21-29).

Metrich is silent regarding the constant current source is controlled as a function of a differential signal of a comparator resulting from the difference between the measuring voltage and a setpoint voltage.

Miyata discloses an air-fuel ratio sensor; wherein, the pump current is controlled as a function of a differential signal of a comparator resulting from the difference between the measuring voltage and a setpoint voltage (8:41-52, the pump current is controlled as a function of the difference between the measured voltage and a reference voltage or setpoint voltage determined by a differential amplifier or comparator). The reference voltage is 450 mV (8:53-67).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the device of Metrich with the comparator for controlling the pump current in the manner recited by Miyata because doing so would allow one to detect the oxygen concentration quickly after the heater is energized (Miyata, 3:30-32).

Furthermore, the comparator and the manner of controlling the pump current as disclosed by Miyata would still allow one to control the pump current of Metrich as well as

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allowing said current to be controlled without being affected by the internal resistance of the measuring cell (Miyata, 5:14-30).

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Metrich (US 5,312,538) in view of Miyata et al. (US 5,895,564) as applied to claims 16, 19, 26 and 28 above, and further in view of Kato et al. (US 6,623,618).

Addressing claim 18, Metrich is silent regarding air is present in the reference-gas space; however, it is well known in the art that atmospheric air is used as reference gas for an oxygen sensor.

However, lacking explicit disclosure from Metrich, Kato discloses a gas sensor; wherein, atmospheric air is introduced into the reference-chamber as the reference gas (7:66-8:6).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the device of Metrich with using atmospheric air as reference gas because all the elements are known in the art and the difference is the combination of known elements into a single device by using the atmospheric air as reference gas.

Furthermore, the atmospheric air, separate or in combination, would not have performed a materially different function for one would still obtain the predictable result of sensing the concentration of oxygen with the atmospheric air as reference as in the manner disclosed by Kato (Kato, 7:66-8:6).

12. Claims 17 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Metrich et al. (US 5,312,538) in view of Hamada et al. (US 4,824,549).

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Addressing claims 17 and 27, Metrich is silent regarding a plurality of pump cells is provided and the outer electrode of each pump cell receives the pump current.

Hamada discloses an oxygen gas sensor (figure 5); wherein, the sensor comprises a plurality of pump cells having a common outer pump electrode 22. Furthermore, the outer electrode 22 of the plurality of pump cells receive the pump current, which is controlled by the magnitude of the signal generated from the measuring cell (5:46-64).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the device of Metrich with the plurality of pump cells with the outer electrode of each pump cell receiving the pump current in the manner disclosed by Hamada because doing so would allow one to compensate for the sensor output for a chronological change (Hamada, 5:46-64) and improving the sensitivity of the sensor (Hamada, 5:7-11).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

BD
02/26/2010